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| 10/553,442 | 02/03/2006 | Takumi Katsurao | 2005_1625A | 1435 |
| 513 7590 01/05/2010 WENDEROTH, LIND & PONACK, L.L.P. 1030 15th Street, N.W., Suite 400 East Washington, DC 20005-1503 | | | | |
| EXAMINER | | | | |
| CHEUNG, WILLIAM K | | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/553,442

Applicant(s)

KATSURAO ET AL.

Examiner

WILLIAM K. CHEUNG

Art Unit

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 November 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/C)
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date 071309

DETAILED ACTION

Request for Continued Examination

1. The request filed on November 9, 2009 for a Request for Continued Examination (RCE) under 37 CFR 1.53(d) based on parent Application No. 10/553,442 is acceptable and a RCE has been established. An action on the RCE follows.
2. In view of the amendment filed November 9, 2009, claims 1-12 are pending.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 4, 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Meguro et al. (US 6,327,136) for the reasons adequately set forth from paragraph 4 of the office action of June 9, 2009.

1. (Currently Amended) A porous membrane of vinylidene fluoride resin, ~~comprising~~consisting essentially of: a copolymer obtained by copolymerization of 100 mols of a vinylidene fluoride monomer and 0.01 – 10.0 mols of a hydrophilic monomer having at least one species of hydrophilic group selected from epoxy group, hydroxy group, carboxy group, ester group, amide group and acid anhydride group.

Meguro et al. (col. 3, line 31-50) disclose a copolymerization process for preparing a vinylidene fluoride copolymers comprising monomethyl mealeate and allyl glycidyl ether intended to be used in the preparation of a separator. Meguro et al. (col. 6, line 34) disclose that the separator is in the form of a porous membrane. Meguro et al. disclose the intrinsic viscosity as claimed for the claimed vinylidene fluoride copolymers (col. 3, line 45-50).

The vinylidene fluoride polymer constituting the electrode-forming composition according to the present invention and functioning as a binder in the resultant activated carbon electrode layer may suitably comprise a vinylidene fluoride homopolymer or a vinylidene fluoride copolymer comprising at least 50 wt. % of vinylidene fluoride and at most 50 wt. % of a monomer copolymerizable therewith.

Examples of the monomer copolymerizable with vinylidene fluoride monomer may include: hydrocarbon monomers, such as ethylene and propylene; fluorine-containing monomers, such as vinyl fluoride, trifluoroethylene, trifluorochloroethylene, tetrafluoroethylene, hexafluoropropylene and fluoroalkyl vinyl ether; carboxyl group-containing monomers, such as monomethyl malate, and monomethyl citraconate; and epoxy group-containing monomers, such as allyl glycidyl ether and crotonic acid glycidyl ether. These are however not exhaustive. Among these, it is preferred to use a vinylidene fluoride copolymer with hexafluoropropylene or trifluorochloroethylene.

The vinylidene fluoride polymer as the binder may preferably have an inherent viscosity of 0.5–20.0 dl/g, more preferably 0.5 dl/g–5.0 dl/g in view of the adhesion with the electroconductive substrate and the mechanical strength of the resultant activated carbon electrode layer. The inherent viscosity is used herein as a measure of polymer molecular weight and refers to a logarithmic viscosity at 30° C. of a solution of 4 g of a sample resin dissolved in 1 liter of N,N-methylformamide.

Meguro et al. disclose all the features as claimed. Claims 1, 2, 4, 9 are anticipated.

5. Claims 1, 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Kashio et al. (US 5,776,637) for the reasons adequately set forth from paragraph 5 of the office action of June 9, 2009.

Kashio et al. (col. 4, line 60-67) disclose a copolymer of vinylidene copolymer comprising vinylene carbonate. Kashio et al. (col. 8, line 23-26) disclose that the copolymer is to be used as a separator, which is a fine porous film (or porous membrane). Kashio et al. disclose all the features of claims 1, 5. Claims 1, 5 are anticipated.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
7. Claim 8 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Meguro et al. (US 6,327,136) for the reasons adequately set forth from paragraph 7 of the office action of June 9, 2009.

Meguro et al. (col. 3, line 31-50) disclose a copolymerization process for preparing a vinylidene fluoride copolymers comprising monomethyl mealeate and allyl glycidyl ether intended to be used in the preparation of a separator. Meguro et al. (col. 6, line 34) disclose that the separator is in the form of a porous membrane. Meguro et al. disclose the intrinsic viscosity as claimed for the claimed vinylidene fluoride copolymers (col. 3, line 45-50). In view of substantially identical composition disclosed in Meguro et al. and as claimed, the examiner has a reasonable basis to believe the that claimed inherent viscosity is inherently possessed by the vinylidene copolymers of Megura et al. Since the PTO does not have proper means to conduct experiments, the burden of proof is now shifted to applicants to show otherwise. In re Best, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977); In re Fitzgerald, 205 USPQ 594 (CCPA 1980).

8. Claims 8, 9 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kashio et al. (US 5,776,637) for the reasons adequately set forth from paragraph 8 of the office action of June 9, 2009.

Kashio et al. (col. 4, line 60-67) disclose a copolymer of vinylidene copolymer comprising vinylene carbonate. Kashio et al. (col. 8, line 23-26) disclose that the copolymer is to be used as a separator, which is a fine porous film (or porous membrane). In view of substantial identical composition of the copolymers disclosed in Kashio et al. and as claimed, the examiner has a reasonable basis to believe that the claimed melting temperature and inherent viscosity are inherently possessed in Kashio et al. Since the PTO does not have proper means to conduct experiments, the burden

of proof is now shifted to applicants to show otherwise. In re Best, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977); In re Fitzgerald, 205 USPQ 594 (CCPA 1980).

9. Claims 10, 11, 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Meguro et al. (US 6,327,136) in view of Takamura et al. (US 6,299,773) for the reasons adequately set forth from paragraph 9 of the office action of June 9, 2009.

12. (Currently Amended) A process for producing a porous membrane of vinylidene fluoride resin comprising: mixing 100 wt. parts of a vinylidene fluoride resin including a copolymer obtained by copolymerization of 100 mols of a vinylidene fluoride monomer and 0.01 – 10.0 mols of a hydrophilic monomer having at least one species of hydrophilic group selected from epoxy group, hydroxy group, carboxy group, ester group, amide group and acid anhydride group with 70 – 250 wt. parts of a plasticizer and 5 – 80 wt. parts of a good solvent for the copolymer to provide a composition; melt-extruding the composition into a film; cooling the film preferentially one side thereof to solidify the film; extracting the plasticizer; and further stretching the film.

Meguro et al. (col. 3, line 31-50) disclose a copolymerization process for preparing a vinylidene fluoride copolymers comprising monomethyl mealeate and allyl glycidyl ether intended to be used in the preparation of a separator. Meguro et al. (col. 6, line 34) disclose that the separator is in the form of a porous membrane. Meguro et al. disclose the intrinsic viscosity as claimed for the claimed vinylidene fluoride copolymers (col. 3, line 45-50).

The difference between the invention of claims 10, 11, 12 and Meguro et al. is that Meguro et al. do not teach the process for preparing the PVDF porous membrane same as the process of claims 10, 11, 12.

However, Takamura et al. (col. 8, example 1) teach a process for preparing a porous PVDF membrane involving extruding the PVDF resins and fiber spinning (stretching process and cooling) for forming the hollow fiber. The process also involves the extraction with sodium hydroxide of the plasticizers out of the PVDF to make the PVDF membrane to become porous. Motivated by the expectation of success of preparing a porous PVDF membrane, it would have been obvious to one of ordinary skill in art to employ the process of Takamura et al. to prepare the PVDF porous membrane of Meguro et al. to obtain the invention of claims 10, 11, 12. Although the process sequence is not identical to the process sequence as claimed, in view of MPEP 2144.04 (C), the rearrangement of the process steps is considered obvious. In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results).

C. Changes in Sequence of Adding Ingredients

Ex parte Rubin, 128 USPQ 440 (Bd. App. 1959) (Prior art reference disclosing a process of making a laminated sheet wherein a base sheet is first coated with a metallic film and thereafter impregnated with a thermosetting material was held to render *prima facie* obvious claims directed to a process of making a laminated sheet by reversing the order of the prior art process steps.). See also *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results); *In re Gibson*, 39 F.2d 975, 5 USPQ 230 (CCPA 1930) (Selection of any order of mixing ingredients is *prima facie* obvious.).

10. Claims 10, 11, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kashio et al. (US 5,776,637) in view of Takamura et al. (US 6,299,773) for the reasons adequately set forth from paragraph 10 of the office action of June 9, 2009.

Kashio et al. (col. 4, line 60-67) disclose a copolymer of vinylidene copolymer comprising vinylene carbonate. Kashio et al. (col. 8, line 23-26) disclose that the copolymer is to be used as a separator, which is a fine porous film (or porous membrane).

The difference between the invention of claims 10, 11, 12 and Kashio et al. is that Kashio et al. do not teach the process for preparing the PVDF porous membrane same as the process of claims 10, 11, 12.

However, Takamura et al. (col. 8, example 1) teach a process for preparing a porous PVDF membrane involving extruding the PVDF resins and fiber spinning (stretching process and cooling) for forming the hollow fiber. The process also involves the extraction with sodium hydroxide of the plasticizers out of the PVDF to make the PVDF membrane to become porous. Motivated by the expectation of success of preparing a porous PVDF membrane, it would have been obvious to one of ordinary skill in art to employ the process of Takamura et al. to prepare the PVDF porous membrane of Kashio et al. to obtain the invention of claims 10, 11, 12. Although the process sequence is not identical to the process sequence as claimed, in view of MPEP 2144.04 (C), the rearrangement of the process steps is considered obvious. In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of

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11. Claims 3, 6, 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Meguro et al. (US 6,327,136) in view of Muller et al. (US 5,066,401) for the reasons adequately set forth from paragraph 11 of the office action of June 9, 2009.

Meguro et al. (col. 3, line 31-50) disclose a copolymerization process for preparing a vinylidene fluoride copolymers comprising monomethyl mealeate and allyl glycidyl ether intended to be used in the preparation of a separator. Meguro et al. (col. 6, line 34) disclose that the separator is in the form of a porous membrane. Meguro et al. disclose the intrinsic viscosity as claimed for the claimed vinylidene fluoride copolymers (col. 3, line 45-50).

The difference between Meguro et al. and claims 3, 6, 7 is that Meguro et al. are silent on a copolymer comprising the comonomers of claims 3, 6, 7.

Muller et al. (abstract) disclose a PVDF porous membrane grafted with oligomeric chains comprising hydrophilic monomer such as acrylic acid/methacrylic acid

(col. 1, line 61), vinylacetate (col. 2, line 22, 59), acrylamide (col. 2, line 58), maleic acid ester (which include maleic anhydride) (col. 2, line 58) and hydroxyethyl (meth)acrylate (col. 2, line 60-65). Further, Muller et al. (col. 19, example 24) disclose that the porous membrane comprise PVDF copolymers in the form of hollow fiber. Regarding the treatment with a basic solution, Muller et al. col. 15, example 11; col. 18, example 23) clearly teach that the PVDF porous membranes have been treated with a basic solution. In view of the substantially identical endeavors of Meguro et al. and Muller et al. in the development of porous membrane based on vinylidene copolymers, it would have been obvious to one of ordinary skill in art to incorporate the hydroxyethyl (meth)acrylate, acrylamide, and maleic anhydride teachings of Muller et al. into the copolymerization process as taught in Meguro et al. to obtain the invention of claims 3, 6, 7.

Response to Arguments

12. Applicant's arguments filed November 9, 2009 have been fully considered but they are not persuasive. Applicants argue that the prior disclose ingredients that are excluded by the claims as being claimed. However, the examiner disagrees because the recited "consisting essentially of" requires the non-essential ingredients to not to affect the properties of the membrane of vinylidene fluoride resin being claimed. To overcome the rejection set forth with the amended feature "consisting essentially of", applicants are required to submit experimental data to show that the ingredients other than the components being claimed in fact can affect the properties the vinylidene fluoride resin being claimed. In view of the reasons set forth above, without any

experimental evidence to show that the ingredients disclosed in the prior art are indeed essential ingredients, the examiner has a reasonable basis to maintain the rejection set forth.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WILLIAM K. CHEUNG whose telephone number is (571)272-1097. The examiner can normally be reached on Monday-Friday 9:00AM to 2:00PM; 4:00PM to 8:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David WU can be reached on (571) 272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/William K Cheung/

Primary Examiner, Art Unit 1796

William K. Cheung, Ph. D.

Primary Examiner

December 30, 2009